REMARKS

The Office Action dated May 17, 2007 has been received and carefully noted. The following remarks are submitted as a full and complete response thereto. Claims 1-26 are submitted for reconsideration.

Claims 1-4, 6-10, 13 and 15-26 were rejected under 35 U.S.C. 103(a) as being unpatentable by U.S. Patent No. 4,636,748 to Latham (hereinafter Latham) in view of U.S. Patent No. 6,819,187 to Ming (hereinafter Ming). According to the Office Action, Latham teaches all of the elements of claims 1-4, 6-10, 13 and 15-26 except for teaching a second switch including a second state opposite from the first state, the second switch coupled to a source of the output diode, where the second switch provides a charge up current to the output diode when the second state includes an ON state. Therefore, the Office Action combined the teachings of Latham and Ming in an effort to yield all of the elements of claims 1-4, 6-10, 13 and 15-26. The rejection is traversed as being based on references that neither teach nor suggest the novel combination of features clearly recited in claims 1-4, 6-10, 13 and 15-26.

Claim 1, upon which claims 2-8 depend, recites a charge pump circuit to supply current to a controlled oscillating circuit. The charge pump circuit includes a first switch including a first state, the first switch coupled to a gate of an output diode. The charge pump also includes a second switch including a second state opposite from the first state,

the second switch coupled to a source of the output diode. The second switch provides a charge up current to the output diode when the second state includes an ON state.

Claim 9, upon which claims 10-17 depend, recites a circuit including a controlled oscillator controlled by an output signal having an offset current. The circuit also includes a charge pump circuit to add a charge up current to the offset current in response to a signal from a phase/frequency detector. The charge pump circuit includes a first switch having a first state and a second switch having a second state to add the charge up current to the offset current, in which the first state is opposite the second state. The circuit further includes an output diode coupled to the first and second switches to provide the charge up current to the offset current.

Claim 18, upon which claims 19-22 depend, recites a charge pump circuit coupled to an oscillating circuit. The charge pump includes a current source and a source switch coupled to the current source to supply a charge up current. The charge pump also includes an output diode having a source coupled to the source switch, wherein the output diode receives the charge up current. The charge pump further includes a gate switch coupled to a gate of the output diode to form a circuit to hold a bias voltage from the gate.

Claim 23, upon which claims 24-26 depend, recites a method for adding a charge up current. The method includes setting a first switch coupled to a gate of an output diode to a first state and setting a second switch coupled to a source of the output diode to a second

state. The second state is opposite the first state. The second switch provides a charge up current to the output diode.

As outlined below, Applicant submits that Latham and Ming do not teach or suggest the elements of claims 1-4, 6-10, 13 and 15-26.

Latham discloses a current pump consisting of a single current source and identical switching paths. It can be implemented using only one type of semiconductors. FIG. 2 of Latham is a block diagram of a phase-locked loop embodying the improved current pump. An integrating capacitor is connected across a bridge, each leg of which contains a switch. A PUMP UP command causes switches 10 and 13 to close, completing a current path for current determined by current source 14 to flow in such direction as to charge capacitor 3. The PUMP DOWN command closes switches 11 and 12, completing the path for the source current to flow in such a direction as to discharge capacitor 3. Prior art difficulties of matching the characteristics of two current sources are eliminated by providing a single current source for both the PUMP UP and PUMP DOWN currents. Difficulties of matching the transient responses of different switching paths are minimized by providing switches that all must pass current in the same direction; they can thus be identical and constructed of the same semiconductor types. Means are provided for controlling the biasing voltages on switching diodes so as to minimize their switching times. See at least Figure 2 and Col. 3, lines 35-63 of Latham.

Ming discloses a charge pump including a charge pump core including output switches. The charge pump core, in response to a drive signal, generates a charge pump output. A limit swing generator, in response to an input signal, generates the drive signal to control the charge pump core. The drive signal has voltage levels including a high level and a low level. The limit swing generator includes at least one voltage generator to control the voltage levels of the drive signal, such that the drive signal tracks a process variable of the output switches.

Applicant submits that the combination of Latham and Ming does not teach or suggest each of the elements recited in claims 1-10 and 13-26. Each of the present pending claims recites a first switch including a first state, the first switch coupled to a gate of an output diode and a second switch, including a second state opposite from the first state, coupled to a source of the output diode, the second switch provides a charge up current to the output diode when the second state includes an ON state. As acknowledged in the Office Action, Latham does not teach these features.

Ming does not cure any of the deficiencies of Latham. The Office Action alleged that Col. 7, lines 50-65 of Ming teaches a charge pump circuit in which a swing generator including the first and second switches are connected together in a diode configuration. The Office Action alleged that the disclosure of Col. 7, lines 50-65 of Ming is equivalent to a first switch including a first state, the first switch coupled to a gate of an output diode and a second switch, including a second state opposite from the first state, coupled to a

source of the output diode, the second switch provides a charge up current to the output diode when the second state includes an ON state, as recited in the pending claims.

Col. 7, lines 50-65 of Ming discloses a charge pump including a charge pump core, including output switches, which generate a charge pump output, in response to a drive signal. The charge pump also includes a limit swing generator which generates the drive signal to control the charge pump core. The cited sections of Ming further discloses that the drive signal has voltage levels including a high level and a low level and the limit swing generator includes at least one voltage generator to control the voltage levels of the drive signal, such that the drive signal tracks a parametric variable of the output switches. The charge pump core, of Ming, further includes a tail current source. The at least one voltage generator, of Ming, includes a first switch and a second switch connected together in a diode configuration.

There is no teaching or suggestion in Ming of a first switch including a first state, the first switch coupled to a gate of an output diode and a second switch, including a second state opposite from the first state, coupled to a source of the output diode, the second switch provides a charge up current to the output diode when the second state includes an ON state, as recited in the pending claims. Instead, in Ming, the at least one voltage generator includes a first switch and a second switch connected together in a diode configuration. Specifically, in Ming, one switch of the voltage generator may be configured as a current source that supplies current to lower switches which are

configured as diodes. Thus, the diode configuration, of Ming, includes one switch which is the current source and one or more switches which are configured as diodes to which current is supplied. See at least Col. 3, line 65-Col. 4, line 12 of Ming. Applicants submit that having multiple switches where one switch is configured as a current source to multiple switches configured as diodes, as discloses in Ming, is not equivalent to a first switch including a first state, the first switch coupled to a gate of an output diode and a second switch, including a second state opposite from the first state, coupled to a source of the output diode, the second switch provides a charge up current to the output diode when the second state includes an ON state, as recited in the pending claims. Therefore, Applicant respectfully asserts that the rejection under 35 U.S.C. §103(a) should be withdrawn because neither Latham nor Ming, whether taken singly or combined, teaches or suggests each feature of claims 1-10 and 13-26.

Claims 11 and 12 were rejected under 35 U.S.C. 103(a) as being unpatentable over Latham in view of Ming and further in view of U.S. Patent No. 6,430,244 to Ryu (hereinafter Ryu). According to the Office Action, Latham and Ming teach all of the elements of claims 11 and 12 except for a multi-modulus divider coupled to the phase/frequency detector and wherein the multi-modulus divider outputs a feedback signal. Therefore, the Office Action combined Latham, Ming and Ryu to yield all of the elements of claims 11 and 12. The rejection is traversed as being based on references

that neither teach nor suggest the novel combination of features clearly recited in independent claim 9, upon which claims 11 and 12 depend.

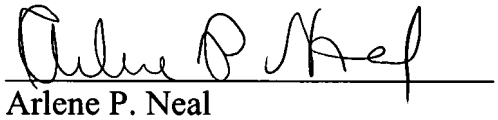
Ryu relates to a digital phase-locked loop circuit producing an output pulse or clock pulses in phase with a reference clock input. Ryu does not cure any of the deficiencies of Latham, as noted above. Specifically, Ryu does not teach or suggest an output diode coupled to the first and second switches to provide the charge up current to the offset current, as recited in claim 9, upon which claims 11 and 12 depend. Therefore, Applicant respectfully asserts that the rejection under 35 U.S.C. §103(a) should be withdrawn because neither Latham, Ming nor Ryu, whether taken singly or combined, teaches or suggests each feature of claim 9 and hence, dependent claims 11-12 thereon.

As noted previously, claims 1-26 recite subject matter which is neither disclosed nor suggested in the prior art references cited in the Office Action. It is therefore respectfully requested that all of claims 1-26 be allowed and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



Arlene P. Neal
Registration No. 43,828

Customer No. 32294
SQUIRE, SANDERS & DEMPSEY LLP
14TH Floor
8000 Towers Crescent Drive
Tysons Corner, Virginia 22182-2700
Telephone: 703-720-7800
Fax: 703-720-7802

APN:ksh